DOCUMENT RESUME

ED 376 285 CE 067 511

TITLE Academic Integration Supplement to the Food Science and Nutrition Curriculum Guide.

INSTITUTION Texas Tech Univ., Lubbock. Home Economics Curriculum Center.

SPONS AGENCY Texas Education Agency, Austin. Dept. of Programs and Instruction.

PUB DATE Jun 94

NOTE 36p.; For the related curriculum guide, see ED 306 382.

AVAILABLE FROM Home Economics Curriculum Center, Texas Tech University, Box 41161, Lubbock, TX 79409-1161.

PUB TYPE Guides - Classroom Use - Teaching Guides (For Teacher) (052)

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.

DESCRIPTORS Behavioral Objectives; Career Exploration; Careers; Course Content; Course Descriptions; *Food Service; *Foods Instruction; Instructional Materials; *Integrated Curriculum; Language Arts; Mathematics Skills; *Nutrition Instruction; *Occupational Home Economics; Postsecondary Education; Science Instruction; Secondary Education; Social Studies; State Curriculum Guides; Units of Study

ABSTRACT

This supplement to a food science and nutrition curriculum guide was developed for use in integrating academic principles with vocational home economics education in Texas. It contains learning and evaluation experiences specifically designed to integrate mathematics, science, language arts, and social studies principles within the food science and nutrition course of study. The conceptual outline as shown in the left-hand column of the guide (with corresponding learning and evaluation experiences in the right-hand column) related to the sub-element of each unit. In the right-hand column, "Key Question" identifies key points for content discussion and review; and "Critical Question" highlights methods of developing critical thinking skills. Ten teaching aids keyed to the learning and evaluation experiences are located at the end of the guide. (YLB)

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Guide to Use

This supplement is part of a series of materials published by the Home Economics Curriculum Center to facilitate integration of academic principles with home economics concepts. The supplement contains learning and evaluation experiences specifically designed to integrate mathematics, science, language arts, and social studies principles within the Food Science and Nutrition course of study. The suggested experiences have been written to satisfy the essential elements of the course, so a teacher desiring to integrate academic principles while meeting a particular essential element can readily identify and incorporate an appropriate activity.

The academic integration supplements comprise the final component in the series of *Academic Integration* materials. Having access to the first two publications in the series—*Integration of Mathematics, Science, and Language Arts Principles in the Home Economics Curriculum* and *Integration of Social Studies Principles in the Home Economics Curriculum*—will greatly enhance effective use of the supplements.

Each of the publications are available from the Home Economics Curriculum Center, Texas Tech University, Box 41161, Lubbock, Texas 79409-1161.

Acknowledgements

The *Academic Integration Supplement to the Food Science and Nutrition Curriculum Guide* was prepared by the Home Economics Curriculum Center staff through a contract with the Texas Education Agency under the provisions of the Carl D. Perkins Vocational and Applied Technology Education Act (Public Law 101-392) in cooperation with the College of Human Sciences, Texas Tech University, Lubbock, Texas. The Home Economics Education unit of the Texas Education Agency provides supervision and directional guidance for curriculum development.

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FOOD SCIENCE AND NUTRITION

I. Nutrition skills

A. Functions and sources of nutrients

Discuss with students the fact that foods contain varying amounts of vitamins. Ask each student to choose a partner. Assign each pair a particular vitamin. Have students use their textbook or other nutrition resources to research problems that result from deficiency of their assigned vitamin. Then have them identify five excellent sources of foods containing that vitamin, find the amount of the vitamin in the food sources, and depict this information on a bar graph. The food sources should be represented by standard serving sizes. Students may either graph the food sources by percentage of U.S. RDA or by milligrams per serving. Have pairs of students report their findings to the class and display their graph. Ask each pair to describe the effects of not consuming an adequate amount of the vitamin. As a class, discuss the graphs. KEY QUESTIONS: Are there one or two food sources that contain the vitamin at a level much higher than the other foods depicted on the graph? What are some ways these foods could be included in a student's diet? What are recipes that contain some of these food items?

Mathematics

Lead students to discuss the functions of water in the human body. Ask students to define the term *dehydration*. Explain to them that all living things need water or they will die. Display a transparency of Teaching Aid 1, Dehydration and the Human Body. Discuss the effects of dehydration on humans and how humans lose water from their body. KEY QUESTIONS: Why is it so important to drink fluids? When might a 100-pound woman begin to feel thirsty? Lead students to brainstorm instances when people may not take in adequate amounts of fluid. (Consider a marathon runner, someone working out in the hot sun, an older adult whose thirst sensation does not function as it did in years past, and an infant who has a bout with diarrhea or vomiting.) CRITICAL QUESTION: What are some guidelines that could be followed to ensure that individuals in these circumstances might take in adequate amounts of fluid?

Mathematics

To introduce the unit on nutrients, have a student look up the word *limey* in the dictionary and share the definition with the class. Then have a student look in an encyclopedia for the story of why English sailors became known as "limeys." (See terms such as Scurvy, vitamin C, or English sailors.) Follow up with a class discussion of the history of vitamin C and the scientist who discovered it.

Science
Social Studies

B. Digestion and metabolism

Help students locate information regarding the metabolism of energy-yielding nutrients. Most Regional Education Service Centers have recent videos on this topic located under the category of biology. Lead the students in a semantic mapping exercise depicting

the breakdown of these nutrients. Draw a circle in the middle of the chalkboard or overhead projector. Write the word *metabolism* in the circle. From the circle, branch off with the words *carbohydrates*, *fats*, and *proteins*. Remind students that carbohydrates break down into glucose, fats into glycerol and fatty acids, and proteins into amino acids, or have them research the breakdown of these three nutrients. For more in-depth semantic mapping, have students continue branching from amino acids by recalling some of the names of amino acids. Lead students to discuss why it is important for the body to ingest energy-yielding nutrients. KEY QUESTIONS: Why is it important for people to consume foods that provide energy? What happens when the body is denied such foods? What happens when people receive too much energy from nutrients? Why are carbohydrates one of the best sources of food energy? Follow up by instructing students to translate the semantic map they created into an outline for a paper. Explain to students that graphic forms are essential mathematics and language arts skills.

Language Arts
Mathematics

Review with the students the information regarding the basic purpose of government found on page 63 of *Integration of Social Studies Principles in the Home Economics Curriculum.* Emphasize that one way governments provide order and security to people is by creating rules that are believed to maintain the common good. Give them the example of the Texas law requiring newborns to be tested for Phenylketonuria (PKU). Either have students research the effects of PKU, or provide information regarding the disorder. Lead students to discuss why there is a law requiring such a test. KEY QUESTIONS: Why would a society require such a test? What would be the long-term effects if the test was not available? How might such outcomes affect society? Why might such a test benefit the common good?

Social Studies

C. Nutritional needs through the life cycle

Instruct students to interview food service managers at a child care center, an after-school program, an elementary school cafeteria, and a senior citizens center to determine the nutritional needs of each age group served by these programs. Have students prepare questions prior to the interviews. To avoid repetition, assign various types of settings to individual students. Ask students to gather guidelines or requirements used by these managers in making decisions. Have each student report results, and lead students to compare and contrast the findings.

Language Arts

Instruct students to investigate nutritional needs of infants, young children, younger teens, older teens, adults, and older adults. Discuss reasons why an increase in different nutrients might be necessary for individuals in each age category. KEY QUESTIONS: Why might a young child's caloric intake need to increase? In what instances might carbohydrates need to be increased in a young teen?

Mathematics

When might an adult need to increase protein? Would protein needs increase in a female adult who is pregnant or lactating? Why? Why might an older adult need increased amounts of calories? What would students recommend for an older adult who has dropped too much weight because of a recent illness? Instruct students to calculate a percent increase of caloric needs in each age group. Tell them to do this by dividing the percent increase by 100 to get the percent's decimal representation. They should then multiply the caloric requirement by the decimal representation of the percent and add the result to the original amount required. For example, if a person requiring an intake of 2,000 calories in one day wanted to increase this intake by 15 percent he or she would

- divide 15 percent by 100 to get .15,
- multiply 2,000 by .15 to get 300, and
- add 300 to 2,000, equaling an increase to 2,300 calories a day.

D. Nutrition and long-term effects

Have students work in groups to research the effects of diets high in cholesterol and sodium. Ask each group to write a newsletter discussing these results. After groups have shared their newsletters with the class, guide students to evaluate the newsletters and select the best one to publish. Students may elect to compile information from more than one newsletter. Arrange for qualified volunteer students to format and print the newsletter using a computer desktop publishing program. Arrange for students to distribute these newsletters in such places as local doctors' offices or senior citizens centers. Extend the learning by asking some students to prepare an illustrated talk on the topic as a STAR event. Point out to students that language competence includes sharing oral and written products in a variety of ways.

Language Arts

Relate to students statistics showing that countries have differing cancer rates. Note that differences are partially due to food choices of the people in these countries. Lead students to discuss the nutritional reasons for these different rates of cancer. KEY QUESTIONS: Why do Japanese women have a lower breast cancer rate than American women? How might the fact that Japanese women consume lower amounts of fat than American women affect this rate? Why might a person who moves from one country to another develop a cancer not typical to the country from which he or she moved but common in the country to which he or she moved? Why might countries like Japan, Finland, and Iceland have increased rates of stomach or gastric cancer? What might the fact that these cultures eat a lot of salt-cured and salt-pickled foods have to do with this increased rate? CRITICAL QUESTION: How are the nutritional concerns related to these cancers addressed in guidelines three and six of the *Dietary Guidelines for Americans*? (NOTE: The complete version of these guidelines is available from the U.S. Department of

Mathematics

CONCEPTS	LEARNING AND EVALUATION EXPERIENCES
	Agriculture, *Nutrition and Your Health: Dietary Guidelines for Americans*.)
E. Dietary planning	Display a transparency of Teaching Aid 2, Food Guide Pyramid. Explain to students that this is an up-to-date food guide that has been made available by the U.S. Department of Health and Human Services and Department of Agriculture. Discuss the fact that these agencies use this format to communicate nutritional concepts. KEY QUESTIONS: Why might this be an effective tool for presenting nutrition information? What types of information can be found on the pyramid? Why might the tool not be useable with young children? Why are foods that should be consumed in the largest number of servings placed at the bottom of the pyramid? Why are fats, oils, and sweets placed at the top? Do you think the pyramid provides an effective format for presenting nutritional requirements? Why? Ask students to translate what has been discussed regarding the Food Guide Pyramid into a paragraph entitled, "The Food Guide Pyramid, What Does It Communicate?"
Language Arts	
	Instruct students to obtain menu plans from the food service manager in their school, from child care centers, or from adult care centers. Ask students to classify foods found in the menus into the categories found in *A Pattern for Daily Food Choices*, available from the United States Departments of Agriculture and Health and Human Services. Remind the students that classification is a scientific tool used to organize data for better understanding and analysis.
Science	
F. Nutritional adequacy	Instruct students to record everything they ate yesterday. Ask them to analyze their food choices by locating each item on a food composition table. They should evaluate their food intake for such nutrients as protein, calcium, and iron and compare each with RDA requirements for their age category and gender. Charts depicting the Recommended Dietary Allowances may be found in nutrition textbooks or other references. Ask students to calculate the percentage of the each nutrient over or under the RDA that they consumed. Tell them to do this by dividing the amount consumed by the recommended amount and then translating that amount into a percentage. For example, if a student consumed 30 grams of protein but should have taken in 45 grams, divide 30 by 45 to get .66. Then multiply this amount by 100 to obtain 66 percent. The student consumed only 66 percent of the amount of protein required.
Mathematics	
	Provide for students information regarding special diets, for example low-sodium diets, low-fat diets, and weight-loss diets. (You may ask students to help assemble examples of a variety of special diets.) Ask each student to select one diet and pretend to take on the role of a dietitian required to explain the diet to a patient. Have students assume that the patient knows very little about how to follow such
Language Arts	

a diet and in fact is resistant to the notion of changing eating habits. Ask students to work in pairs to write a dialogue between the dietitian and the patient. The dietitian must convince the patient of the necessity to convert to this type of diet and explain the procedures to follow. Have students present their dialogue to the class. Lead a class discussion on the concepts presented. KEY QUESTIONS: What were examples of special diets presented? When would an individual need to follow each diet? What benefits would result from the patient's following the diet? What consequences might result from failure to follow the diet in each case? What were some techniques presenters used to convince patients to convert to the diets? Which techniques were effective? ineffective?

G. Food intake and health

Tell students that they will be comparing their food choices with those made by people in different countries. Do this as follows:

- Ask students to write items they had for dinner last night. Based on their knowledge of nutrition, ask them to evaluate the meal's nutritional adequacy.
- Assign each student a different country. Ask them to research the typical food choices people make for dinner in each country. They should identify the staples of the diet and what the country's economic, societal, and religious influences determine about food choices. Have students list food choices an individual in their assigned country might make for a typical dinner and evaluate the nutritional adequacy of the meal. Have students present their findings to the class.
- Lead students to compare and contrast the nutritional adequacy of their own dinner to that of typical dinners in the assigned countries.

Social Studies

Obtain a copy of the school lunch menu for one week from the cafeteria manager. Distribute to students a copy of the menu and Teaching Aid 2, Food Guide Pyramid. Ask students to describe five typical fast-food meals that students not eating in the cafeteria might eat at lunch. Have students analyze the contents of one week's school menu meals and one week's fast-food meals for containment of the five major food groups and fats, oils, and sweets. Instruct students to compare and contrast the cost of eating fast food for a week against the cost of eating in the school cafeteria. Lead students to discuss the food value and cost of each week-long menu. KEY QUESTIONS: Which week-long menu costs more? Why? Which week-long menu provides more servings from the five major food groups? What does it mean to "pay for empty calories"? What empty-calorie foods were found in each menu? When you consider food value and cost, which week-long menu makes more sense? What nutritious fast-food choices might be substituted for items which were not considered nutritious?

Mathematics

CONCEPTS	LEARNING AND EVALUATION EXPERIENCES
H. Nutritional information reliability	Review with the students the explanation of distinguishing between fact and opinion, grounded and ungrounded belief, and rational thought and rationalization found on page 92 of *Integration of Mathematics, Science, and Language Arts Principles in the Home Economics Curriculum*. Ask them to apply this information to a discussion regarding the consumer's need to be able to decipher between fact and opinion, grounded and ungrounded belief, and rational thought and rationalization when choosing a food product. KEY QUESTIONS: What are some examples of facts that can be stated about food products? What are opinions that might cause a person to buy one product over another? What are some beliefs about food products that are grounded? ungrounded? Why might someone rationalize buying a food product? What are examples of ways students rationalize buying empty-calorie foods over more nutritious choices? What kind of rational thought can be applied to food choices? Ask each student to write a paragraph describing why it is important to weigh fact against opinion when making food choices.
Language Arts	
	Review with students the information regarding the scientific method found on page 70 of *Integration of Mathematics, Science, and Language Arts Principles in the Home Economics Curriculum.* Have students bring examples of nutritional claims from various sources such as newspapers, magazines, books, advertisements, and television. Ask them to work in groups of three, instructing each group to create a study to test one such claim. Instruct them to use the steps of the scientific method in developing this study. Remind them that the method requires attitudes of honesty, objectivity, openness, skepticism, questioning, accuracy, carefulness, and unbiased evaluation. Have the groups share their methods with the rest of the class. Have students analyze each method and predict the outcome of the study.
Science	
I. Food fads, fallacies, and facts	Instruct students to locate articles that discuss popular weight reduction diets. Articles should include food plans that list the number of servings and serving sizes. Have students decide what age group and gender has been targeted by each diet. Distribute a copy of the RDAs for the particular groups targeted. Ask students to compare and contrast each diet with the RDA for the chosen group. Lead a class discussion on the findings. KEY QUESTIONS: How does each diet compare with the RDA? Does it provide more nutrients than are required? less nutrients than are required? What might be the short-term effects of the diet on the body? long-term effects? Should this diet be recommended to individuals in the target group? Why? As a follow-up activity have students rank the diets from worst to best and justify their rankings.
Language Arts *Mathematics*	

CONCEPTS	LEARNING AND EVALUATION EXPERIENCES
Science	Display a transparency of Teaching Aid 3, The Weight Cycle. Use the diagram to explain how repeatedly losing and gaining weight can affect the makeup of the body and the way the body uses food. Lead students to discuss how use of fad diets, especially very-low-calorie or very-low-carbohydrate diets, can contribute to this problem. KEY QUESTIONS: Why would a low-calorie or low carbohydrate diet promote loss of lean muscle mass? What does the body burn when it does not have access to enough food energy? What happens to a person's muscle content with each cycle of weight loss and weight gain? Why would a person's body fat content increase when the person gains weight after a diet? Why might it be a better idea to maintain a stable weight than to go up and down in weight? Why is exercise one of the best ways to become fit? Why would increasing muscle mass increase the body's ability to burn food energy? Divide the class into groups. Have each group locate or develop a diet and exercise plan which promotes good health and one that does not promote good health. Ask groups to share their plans with the class.
II. Cultural influences on food and nutrition A. Individual and family food options *Social Studies*	Review with students the information regarding food choices in Latin America found on the top of page 62 of *Integration of Social Studies Principles in the Home Economics Curriculum*. Ask students to confirm the accuracy of the information regarding staples of the diet by researching and finding examples of various common food items in the cultures discussed on page 62. Have students determine why various food items are found in particular regions. Ask them to consider such things as tradition, economics, and terrain of the various regions. Then have students determine how the food choices of these various cultures has influenced American cuisine.
Language Arts	Instruct students to choose partners to interview regarding one another's cultural and family influences on food choices. Sample interview questions could include the following: What types of food does your family eat? What types of cultural influences affect your family's food choices? What are some examples of food choices influenced by culture or tradition? What traditional food choices does your family make at various holidays? Why? Following the interviews, have partners form three or four groups with remaining class members to share the information obtained. Reassemble the class to brainstorm two lists: one titled "Cultural Influences of the Group" and the other titled "Food Choices of the Group." Ask students to list various examples for each list and to compare and contrast the information found on each list.
B. Nutritional adequacy of diets representative of different cultures	Review with students the information regarding weather and climate found on page 51 of *Integration of Mathematics, Science, and Language Arts Principles in the Home Economics Curriculum.*

CONCEPTS	LEARNING AND EVALUATION EXPERIENCES
	Then review the information regarding various types of climates found on pages 80-81 of *Integration of Social Studies Principles in the Home Economics Curriculum*. Ask students to give examples of regions that have these various types of climates. Instruct students to research foods grown in these regions, describe the foods consumed in these cultures, and classify each food according to the categories found in Teaching Aid 2, Food Guide Pyramid. If the pyramid does not include examples of food choices from these various regions, have students recommend where these items might be placed on the pyramid. Lead students to discuss the nutritional adequacy of the diets in the regions. KEY QUESTIONS: Is each food group represented? How? Ask students to deduce what effect the weather and climate might have on food choices and nutritional adequacy of a particular region.
Science	
	Write the term *developing nation* on the chalkboard or overhead projector. Lead students to define the term. Ask them to hypothesize why people in developing countries might have nutritionally inadequate diets. Tell students that there are many diseases related to nutrient inadequacy and that one such disease is Kwashiorkor. Read to students the information found on Teaching Aid 4, Kwashiorkor in Kingdom X. Instruct students to be prepared to discuss the content of the story. KEY QUESTIONS: What disease does Adi have? What are the symptoms of the disease? How did she get it? How is the disease treated?
Science *Social Studies*	
III. Management skills A. Principles of consumerism	Review with the students the information regarding the presidential system found on page 64 of *Integration of Social Studies Principles in the Home Economics Curriculum* and information regarding the three branches of government found on pages 71-73 of the same book. Explain that in 1962 President John F. Kennedy described four basic consumer rights to the Congress of the United States. Because he as president was not a part of the lawmaking body, he could not create new laws but could set into motion a movement to create laws. Ask students to describe how this address might have affected the creation of new laws. Review with the students the information regarding the characteristics of a mixed free-enterprise economy found on pages 14-15 of *Integration of Social Studies Principles in the Home Economics Curriculum*. Use Teaching Aid 5, Consumer Rights and the Purchase of Food, as a resource and ask students to respond to the questions. Follow up by leading students to brainstorm other ways these four consumer rights are implemented in food purchasing.
Social Studies	
	Ask students to bring packages of food items that have the new food label. Tell them that the title "Nutrition Facts" is on the new label. Point out where the serving size is located. Describe the importance
Mathematics	

of the new nutrient list. Instruct students to do the following:

- Locate such things as total fat, cholesterol, sodium, total carbohydrate, and protein on their labels.
- Locate the two vitamins and two minerals whose amount must be identified on the food item.
- Calculate the percentage of nutrient requirements remaining after consumption of the food product. For example, if a serving of potato chips provides 26 percent of the fat a person consuming a 2,000 calorie diet should eat in one day, what percentage remains?

After students have mastered this concept, point out that the daily values for a 2,000 and a 2,500 calorie diet are found at the bottom of the label.

B. Meeting daily food needs

Language Arts
Mathematics

Distribute to each student a copy of Teaching Aid 6, Survey of Where People Eat. Instruct students to complete the top grid of eight squares by surveying the represented individuals regarding the number of meals they eat out and at home during the week. Use the results from the survey, and as a group, calculate the average number of meals in each category by following the instructions on the handout. Ask students to create a bar graph depicting the results. Lead a class discussion on the findings. KEY QUESTIONS: Which group eats out the most? Why do you think this is so? Which group eats out the least? Why do you think this is so? Which group do you think spends the most money on food? Why? Ask the students to create a list of restaurants whose advertisements aim at each population surveyed.

Social Studies

Review with students the information regarding Prosperity and Poverty found on page 31 of *Integration of Social Studies Principles in the Home Economics Curriculum*. Ask students to imagine the strains that the Depression must have put on the average American family. Invite a panel of individuals who remember every-day life during the Depression. Have the panel members share about their family's economic difficulties and how they as a family met basic needs, especially the need for food. Have students prepare in advance a list of questions to ask the panel. Questions might inquire about how protein needs were satisfied, the role of the family garden, staples of the diet, special foods, how going through a depression affects attitudes toward food, and how the Depression affected family celebrations. Follow up by asking students to write a grocery list for shopping during the Depression.

C. Work space and equipment in meal preparation

Science

Have students research how a conventional oven, a convection oven, and a microwave oven work. Review with them the information regarding principles of heat and thermodynamics found on page 58 of *Integration of Mathematics, Science, and Language Arts Principles in the Home Economics Curriculum.* Ask students to

decide the type of oven that fits into each category of heat transfer. Instruct students to prepare a selected recipe in each of the three types of ovens. Have each group prepare the same recipe to ensure that the variables are controlled in this experiment. Have them work in groups to analyze each product for preparation time, taste, texture, and palatability. Lead students to draw conclusions about the three types of ovens.

Mathematics

Display a transparency of Teaching Aid 22, Kitchen Planning, found in the Curriculum Guide. Remind students that the work triangle should not be more than twenty-two feet. Have students measure the work triangles in their foods laboratory. As a class, compare the various dimensions of individual work areas. Ask students to measure the work triangle in their own home. Lead a class discussion on the findings. KEY QUESTIONS: Did the work triangle in the students' homes exceed twenty-two feet? What are the possible effects of working in a kitchen with a work triangle exceeding twenty-two feet? What effects result from too little space in a kitchen work triangle? too much?

D. Safety and sanitation

Have students research information about food-borne illness. Supplement this information by reviewing the following information:

> Microorganisms are too small to see, yet they are everywhere. When microorganisms are allowed to grow on food, they can cause food-borne illness. The result of such illness can be vomiting, diarrhea, and in extreme cases death. The incidence of food-borne illness can be reduced by making sure that everything used to prepare food is clean.

Ask students to describe things that come in contact with food that is being prepared. Lead students to discuss other ways to prevent food-borne illness. KEY QUESTIONS: Why is it important to cover food properly? Why should food be stored at the correct temperature? Why is it important to discard food that has been stored for too long? Why should cans that are swollen or dented not be used? Collaborate with a science teacher at your school to design an experiment that demonstrates the importance of safe food handling. The experiment should grow colonies of microorganisms using agar in petri dishes. The dishes can be inoculated with microorganisms from such things as table surfaces, utensils before and after washing, unprepared or unwashed food, coughs, hair, and fingernail scrapings. Make sure that safety precautions are utilized in preparation and examination of the dishes; for example, pathogenic bacteria can sometimes multiply in petri dishes. The substances can be dangerous. Insist that no culture be examined without supervision. After the experiment has been completed, lead students to discuss the importance of safe food handling. KEY QUESTIONS: Which growth surprised students the most? Why? Which growth was expected? Did any petri dish not grow microorganisms? Why? Ask

Science

students to compose a pamphlet recommending safe food handling practices.

Review with students the information regarding mixed free-enterprise economy found on page 14 and limited government intervention found on page 15 of *Integration of Social Studies Principles in the Home Economics Curriculum.* Invite a representative from the health department to give a talk regarding governmental control of food safety in the foods industry. Ask students to prepare questions in advance to guide the representative's presentation. Questions might cover such topics as the right of the government to set standards and inspect an establishment, the effect of standards and inspection on the concept of free-enterprise, laws and restrictions intended to reduce food-borne illness, opposition sometimes faced in enforcing laws, how food-related businesses are inspected, and major causes of food-borne illness in restaurants. Students might also prepare questions directly related to food-borne illnesses, such as age groups most affected by food-borne illness and the results of food-borne illness. As a follow-up activity, ask students to write a paragraph describing recommendations for food safety in food-related businesses, pretending that they are health inspectors in a fictitious country. Have them describe how these recommendations fit into the mixed free-enterprise market economy of the fictitious country.

Language Arts
Social Studies

E. Preparing nutritious meals

Instruct students to examine dry and liquid measuring cups and measuring spoons. Hold up the various sizes and types of measuring equipment, and ask students to identify each by name and by size. Tell them that measuring accurately can make the difference between a successful food item and an unsuccessful food item. List the abbreviation for cup, tablespoon, teaspoon, pound, ounce, gallon, quart, and pint on the chalkboard or overhead projector. Have students record the abbreviations. Note that many recipes use abbreviations and the importance of remembering them. Distribute to each student a copy of Teaching Aids 7a and 7b, Equivalents. Discuss customary measuring equivalents while students fill in the answers. Follow up this discussion by having students complete Teaching Aid 8, Standards of Measurement. Review the answers orally by using an overhead projector and displaying a transparency of the Teaching Aid. Be sure to explain any areas with which students had difficulty.

Mathematics

Instruct students to bring a favorite family recipe to class. Review with students formats for presenting recipes. Choose one format, and have students rewrite their family recipes using that style. Lead students to discuss the process. KEY QUESTIONS: Was it difficult to convert the recipe? Why? What, if any, problems did you have? Is it important that all the recipes in one cookbook utilize the same

Language Arts

format? Why? Lead students to combine the recipes into one cookbook for distribution to the class. Utilize selected recipes in laboratory experiences.

F. Nutritious diets for budgetary needs

Discuss the fact that families budget varying amounts of money for purchasing food. Explain that families usually budget between 15 and 30 percent toward food. Lead students to discuss why this percentage varies from family to family. KEY QUESTIONS: Why might a family with a higher income spend less of their total income on food than a family with a lower income? How might the need to spend more on food affect other areas of the budget of a family with less money? Write the monthly income of a fictitious family on the chalkboard or overhead projector. Lead students to decide what percentage of this family's monthly budget is spent on food. Instruct each student to calculate the dollar amount the family budgets for food by converting the percent to a decimal (divide the percent by 100) and multiplying the total family income by the resulting decimal. For example, if a family makes $1,200 per month and spends 30 percent of this amount on food, to find out the dollar amount spent on food:

Mathematics

1. Divide 30 by 100 to get .30.
2. Multiply $1,200 by .30 to get $360.
3. The amount of money the family budgets for food in one month is $360.

Have students work in groups to check their answers after you have assigned the problem. Make sure students show their work. Continue to give problems until students understand the method. Stress why knowing the dollar amount budgeted on food can be helpful in food selection and food purchasing. (NOTE: Equivalencies between percents and decimals are covered on page 15 and in Teaching Aid 1, Equivalencies between Fractions, Decimals, and Percents, in *Integration of Math, Science, and Language Arts Principles in the Home Economics Curriculum.*) This activity can be incorporated with the Skills for Life STAR event.

Social Studies

Review with students the information regarding supply and demand found on page 12 of *Integration of Social Studies Principles in the Home Economics Curriculum.* Using food advertisements, demonstrate the theory by citing instances where out-of-season fruits and vegetables cost more than those same fruits and vegetables when they are in season. Point out that out-of-season products must often be shipped long distances, sometimes from outside of the country. Out-of-season products grown in hothouses are more susceptible to disease; therefore, they can be more expensive due to a lower production rate. Have students work in cooperative learning groups to perform the following tasks:

- Infer how bringing produce long distances or growing it in a hothouse can affect supply.

CONCEPTS	LEARNING AND EVALUATION EXPERIENCES
	• Deduce the importance of buying in-season fruits and vegetables. • Brainstorm other food items that are affected by supply and demand, and explain how each is affected. Ask groups to present results to the class.
IV. Relating food and nutrition to special needs A. Special dietary needs *Language Arts* *Science*	Have student volunteers contact the American Association for Retired Persons (AARP) and other older adult organizations to obtain pamphlets about dietary needs and guidelines for older adults. Ask students to review the literature that has been sent or use other resources and prepare a short talk on an assigned topic. Topics can include the interplay of medication and nutrients, why nutrient needs vary between older adults, the effects of aging on nutritional health, digestion and nutritional health, water intake and nutritional health, bone health and aging, and cardiovascular health and aging. After presentations are completed, ask students to synthesize the information into a diet plan for older adults. Ask the students to share their ideas with a partner, and combine the ideas in a class discussion. KEY QUESTIONS: What are some general guidelines a healthy older adult might consider in planning meals? How might these guidelines affect general health? How do these guidelines differ from those used for younger individuals? Why?
Mathematics *Science*	Ask students to research cholesterol and fat in the diet. Have them • describe the difference between saturated, polyunsaturated, and monounsaturated fat; • link high intakes of saturated fats to elevated blood cholesterol levels and an increase risk of heart disease; • give examples of fats that are saturated; • describe the functions of polyunsaturated fat; and • describe the functions of monounsaturated fat. Ask students to gather various sources of saturated, polyunsaturated, and monounsaturated fats. Point out the following information: Saturated fats are usually solid at room temperature. The process of hydrogenation is used by food manufacturers to change polyunsaturated vegetable oils into saturated vegetable oils. This process of adding hydrogen to unsaturated fat makes these polyunsaturated oils become saturated. Lead students to brainstorm health conditions that require reduction of saturated fat intake. Distribute to each student a copy of Teaching Aid 9, Circle Graphs of Various Fat Sources. Review with students the information regarding charts and graphs found on page 29 of *Integration of Mathematics, Science, and Language Arts Principles in the Home Economics Curriculum.* Ask the students to follow the directions and complete circle graphs for each fat source listed in the table. When students have completed their graphs, as a group, rank the fat sources from least saturated fat to most saturated fat. Ask

them to suggest food choices for individuals who must reduce saturated fat intake.

B. Dietary needs and sports

Mathematics
Science

Ask students to bring packages from favorite snack foods to class. Gather snack packages for a display. Distribute to each student a copy of Teaching Aid 10, Calculation of Energy Needs. Have students complete the activity, and lead students to discuss their findings. KEY QUESTIONS: Were you surprised how long it would take you to use the food energy from your snack if you were sedentary? Why? How much less time would it take you to use the calories from the snack if you were lightly active? heavily active? Ask students to relate these findings to weight gain, weight loss, and maintenance. This activity can be incorporated with the Skills for Life STAR event.

Science

Lead a class discussion on dietary needs for people involved in sports. Divide the class into groups of two. Have each pair select a sporting event, such as football, basketball, swimming, or cross country running. Encourage pairs not to select a topic already chosen by another pair. After a sporting event has been selected, instruct the pairs to conduct research on the dietary needs of a person prior to and during competition of the selected sporting event. Have pairs prepare a report to share with the class, including how the foods consumed aid the athlete during competition. Allow students to interview coaches or sports trainers as a part of their research. Have students share their work with the class.

C. Differentiate eating disorders, their effects, and treatment

Social Studies

Review with students the information regarding socialization found on page 87 of *Integration of Social Studies Principles in the Home Economics Curriculum*. Point out the four types of socialization processes and have students cite examples of each. Point out that both positive attitudes and negative attitudes can develop through socialization. For example, the driving behavior of students taking a driver's education course is reinforced by the possibility of receiving the reward of the license. Ask students to determine what process is displayed when members of society look to the media for role models of physical beauty. Lead students to discuss how this socialization process may lead to eating disorders. KEY QUESTIONS: Why are the role models displayed in the media often unrealistic? How does the media promote such role models? What might the effect on self-esteem be when a person compares himself or herself with such a role model? How might this comparison translate into an eating disorder? Why is it better for people to recognize and value their own personal qualities and talents rather then compare themselves with unrealistic role models displayed in the media? Follow up by having students read biographies of famous people who have had eating disorders. Ask students to

conclude ways these individuals were influenced by society and to describe contributions these individuals made to society apart from the way that they looked. Examples might include Karen Carpenter, Sally Field, Sandra Dee, and Tracy Gold.

After presenting information on eating disorders, instruct students to form groups of three to write a short story with the principle character a young person who has an eating disorder. The plot should center around the effects of the disorder, and the end of the story should include ways that the eating disorder was treated. As a follow-up activity, ask students to turn their stories into short plays to present to the class.

Language Arts

D. Meeting nutritional needs for persons in self-care

Review with students the types of governments classified according to economic philosophy found on page 65 of *Integration of Social Studies Principles in the Home Economics Curriculum.* Invite a social studies teacher to talk about examples of each type of government and the government's attitude toward children, the elderly, and individuals with disabilities. Specifically, ask the guest to discuss how a society under each type of government is likely to address nutritional needs of such groups. If possible, have the teacher describe specific government programs in various countries. Have students take notes and prepare a written description of each type of government. To extend the activity, instruct each student to research a specific country to find out how its government is involved in the nutritional needs of children, the elderly, and individuals with disabilities.

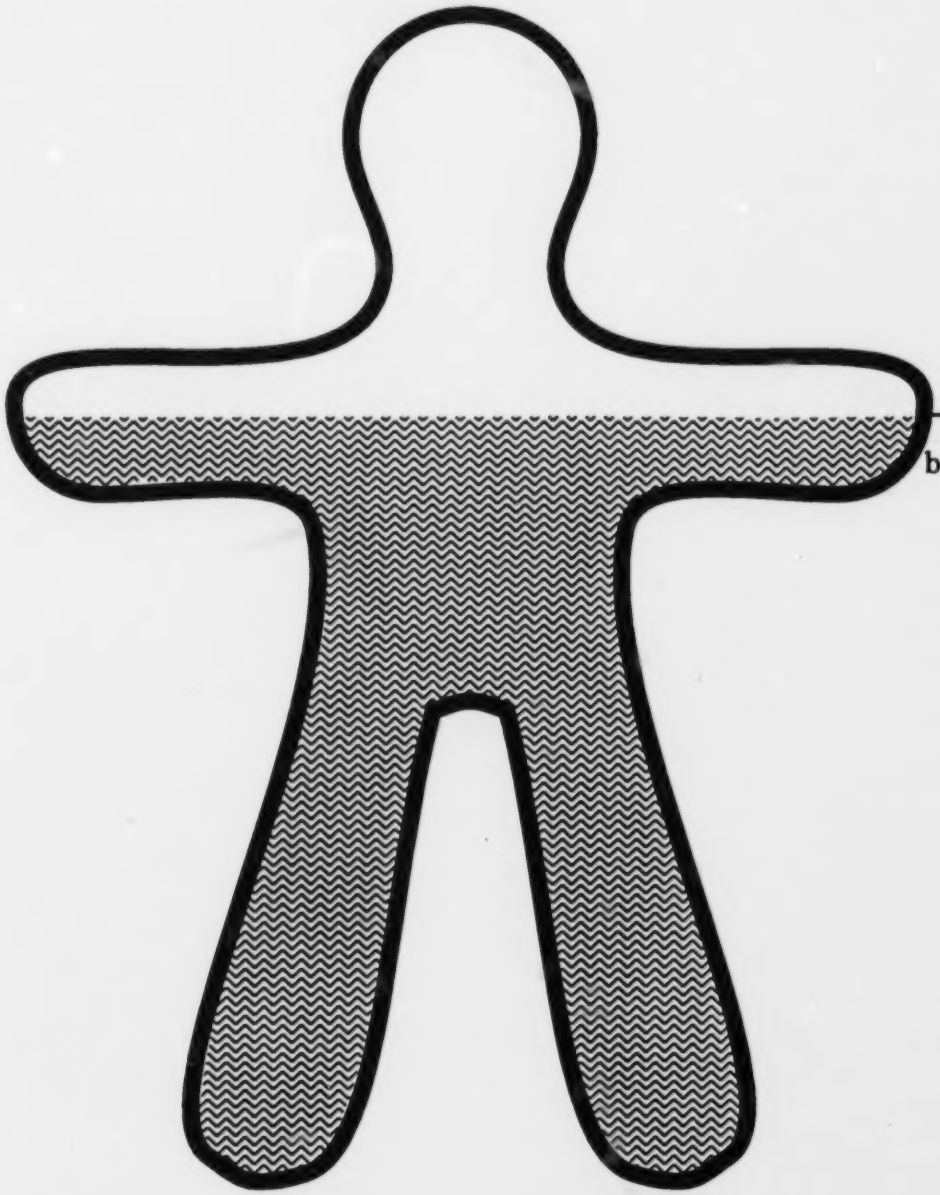
Social Studies

Review with students information regarding forms of propaganda found on pages 92-93 of *Integration of Mathematics, Science, and Language Arts Principles in the Home Economics Curriculum.* Lead students to discuss ways television commercials influence food purchases. KEY QUESTIONS: What is the main way that television stations make money? Why does the food industry advertise on television? What are some food advertisements that catch your eye? Why? What would happen if advertisements failed to produce an increase in sales? What are some examples of advertisements specifically aimed at children? What methods do advertisers use to appeal to children? What time of the day are these advertisements typically broadcast? Why? What types of programs do these advertisements typically accompany? Why? Do all food advertisements aimed at children promote nutritious foods? If not, which promote high sugar, high salt, and low nutrient foods? Ask students to judge the effect that food advertising aimed at children has on children's attitudes toward food. Instruct students to choose a partner and develop an advertisement aimed at children that promotes nutritious snacks. CRITICAL QUESTIONS: What are

Language Arts

CONCEPTS	LEARNING AND EVALUATION EXPERIENCES
	ways parents can combat the effects of advertising aimed at their children? How can parents promote nutritious foods even though their children may be influenced by advertisements for less nutritious foods?

Dehydration and the Human Body

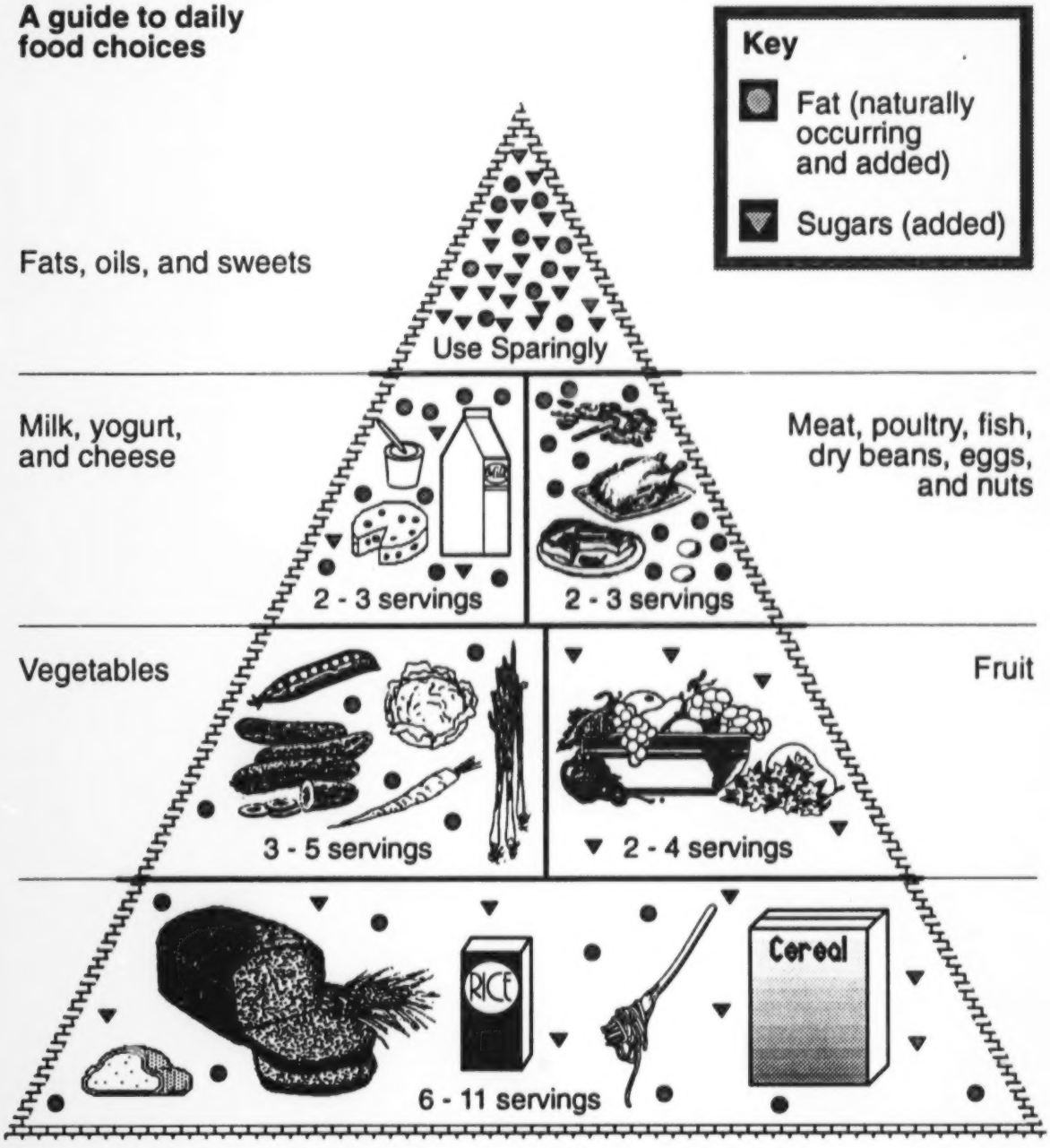


55-70 percent of a human's body is composed of water.

- lose about 2 percent of body weight in fluids and become thirsty
- lose about 4 percent of body weight in fluids and become weak
- lose about 20 percent of body weight in fluids and lapse into a coma or die

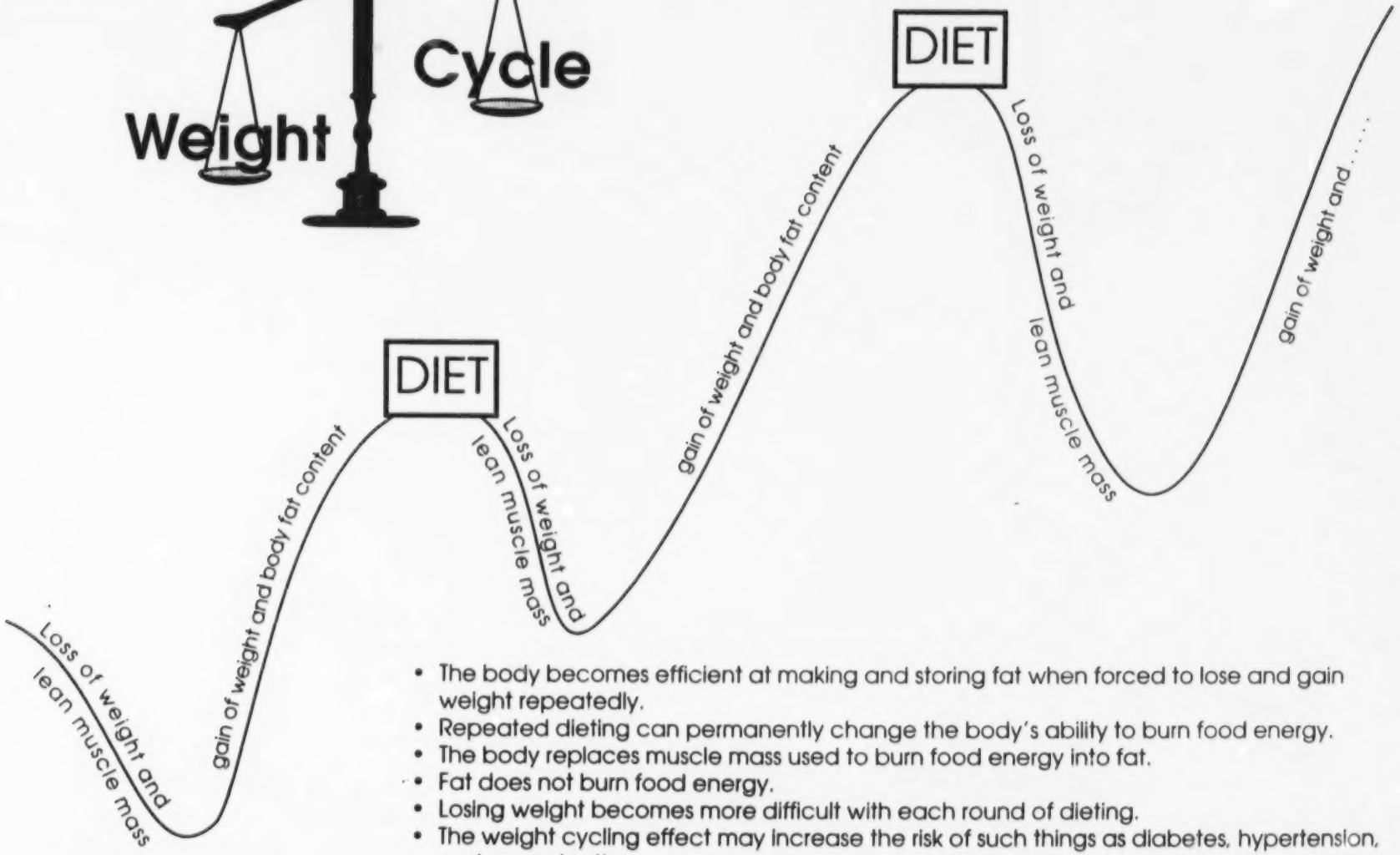
Food Guide Pyramid

A guide to daily food choices



Adapted from: "The Food Guide Pyramid," Home and Garden Bulletin No. 252, United States Department of Agriculture Human Nutrition Information Service.

The Weight Cycle


DIET
DIET
Loss of weight and lean muscle mass
gain of weight and body fat content
Loss of weight and lean muscle mass
gain of weight and body fat content
Loss of weight and lean muscle mass
gain of weight and . . . . .

- The body becomes efficient at making and storing fat when forced to lose and gain weight repeatedly.
- Repeated dieting can permanently change the body's ability to burn food energy.
- The body replaces muscle mass used to burn food energy into fat.
- Fat does not burn food energy.
- Losing weight becomes more difficult with each round of dieting.
- The weight cycling effect may increase the risk of such things as diabetes, hypertension, and even death.
- Maintaining a stable weight is less harmful to health than repeated dieting.

TA 3

Kwashiorkor in Kingdom X

Adi lives in Kingdom X. She is two years old. Adi has a one-year-old brother. Adi's growth has slowed considerably. She has developed dark patches on her skin, she feels listless, and often withdraws from other people. Adi's mother breast-fed her until becoming pregnant with Adi's brother. At that point she began to feed Adi the starch roots that are native to their region. These roots are low in protein when compared with the total calories that they supply. The root provides a lot of fiber, but it is difficult for Adi to eat enough of this food item to supply energy needs.

Adi has Kwashiorkor, which is a disease that is caused by a severe lack of complete protein. Complete protein is required so that the body can function. Kingdom X is considered a developing nation. It is common for people in this type of nation to lack foods high enough in complete protein. Kwashiorkor also can occur when famine victims are fed foods lacking complete protein. This is why it is important that humanitarian groups assisting such victims provide foods with complete protein. One such group is on its way to assist the people in Adi's town. Their plan is to supplement the diet with high-protein foods.

If Adi was not provided with such assistance she might develop additional symptoms like change in hair color, massive swelling of the abdomen and legs, fat in the liver, or inability to move or cry very much. The end result of Kwashiorkor can be death, and it usually strikes children between the ages of one and three.

Consumer *Rights* and the Purchase of Food

The Right to Be Informed

- In what ways do manufacturers inform consumers about food products?
- What type of information is available to consumers because of food labeling?
- Why is it important that the name and address of the manufacturer be found on the label?
- Why should the net quantity of the product by displayed on the label?

The Right to Safety

- How has the consumer's right to safety been considered in product labeling?
- How might open dating be a safety feature on food items?
- Why is it important that a federal agency like the Food and Drug Administration enforce laws concerning food safety?

The Right to Choose

- How is a consumer's right to choose evident in most grocery stores?
- Why do grocery stores often provide several brands of one food item?
- Why has the USDA required that the grade of meat and dairy products appear on these types of items?
- How does this benefit consumers
- Why is it in the consumer's interest that one company not monopolize the distribution of a particular food product?
- Why does the government regulate business in order to promote fair competition?
- Why would price fixing, or an agreement between manufacturers to price a like item the same, not be in the best interest of the consumer?

The Right to Be Heard

- How might consumers utilize the name and address printed on the label of food items?
- Why might a consumer complaint in a grocery store result in better service and products?
- In what instances might it be necessary to rely on the legislative or judicial system to solve consumer problems associated with food purchasing?

Survey of Where People Eat

1. Using the class findings, divide the total number of meals in each category by the number of people surveyed. For example, if the total number of meals eaten out by students was 130 and 20 students were surveyed, dividing 130 by 20 would yield 6.5 meals eaten outside the home by the ***average*** student surveyed.

2. Compare each of the eight categories by creating a bar graph to display the results.
   - Average number of meals should be indicated on the vertical axis.
   - Each of the eight categories should be indicated on the horizontal axis.

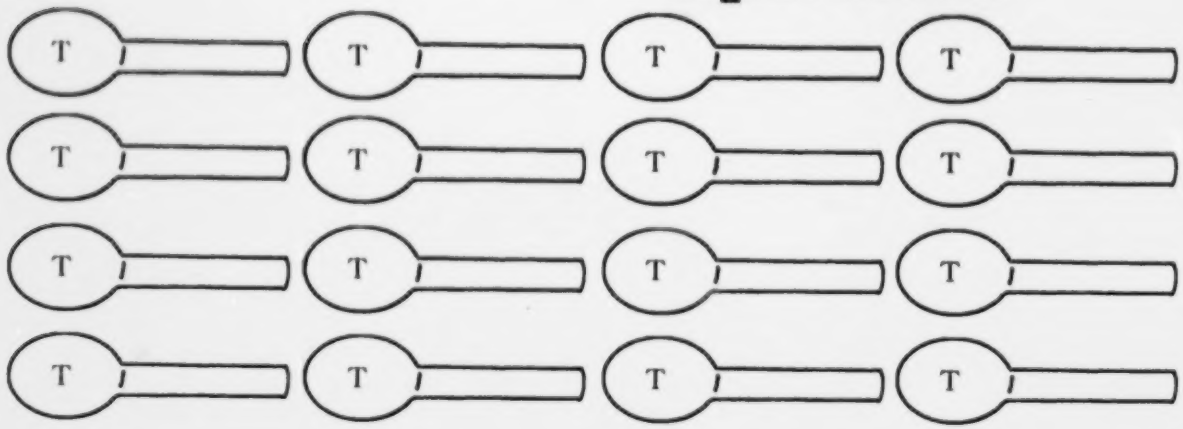
	Student	Person Not Working Outside the Home	Person Working Outside the Home	Retired Person
(individual student findings)				
# of meals eaten at home in one week				
# of meals eaten out in one week				

(class findings)

Totals (meals eaten at home)	(total number of meals)	(1)	(2)	(3)	(4)
	(total people surveyed)				
Totals (meals eaten out)	(total number of meals)	(5)	(6)	(7)	(8)
	(total people surveyed)				

TA 6

Equivalents



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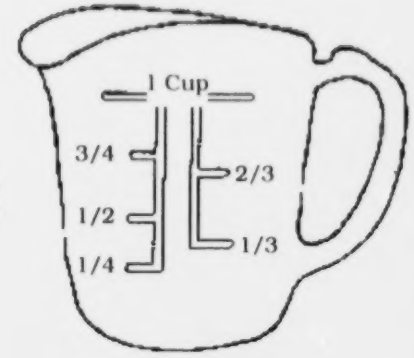
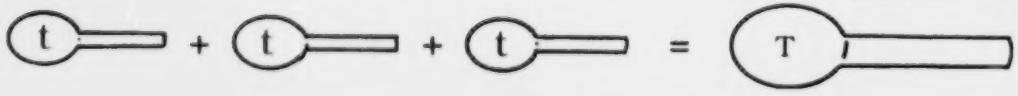


_____ tablespoons = 1 cup

_____ tablespoons = 1/2 cup

_____ tablespoons = 1/4 cup

_____ tablespoons = 1/8 cup



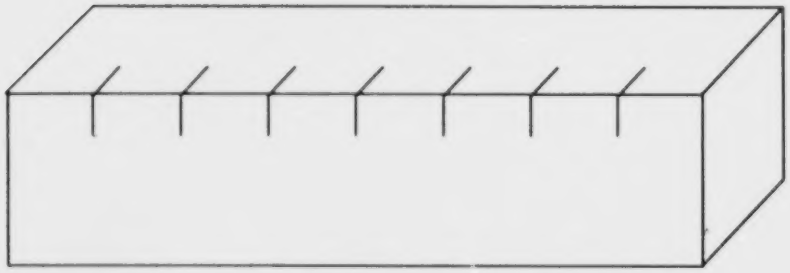
_____ teaspoons = 1 tablespoon

_____ teaspoons = 1/2 tablespoon

_____ tablespoons = 1/3 cup

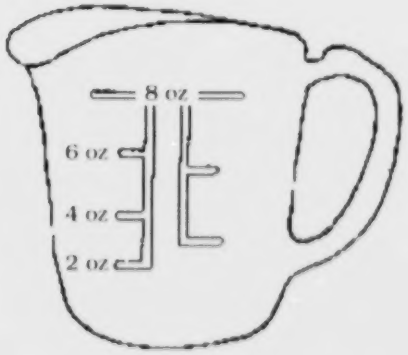
_____ tablespoons and _____ teaspoon = 1/3 cup

Equivalents



1 stick margarine = _____ tablespoons

1 stick margarine = _____ cup



1 cup = _____ fluid ounces

_____ tablespoons = 1 fluid ounce

1 pint = 2 cups

1 quart = 2 pints

1 gallon = 4 quarts

1 pound = 16 ounces

TA 7b

Standards of Measurement

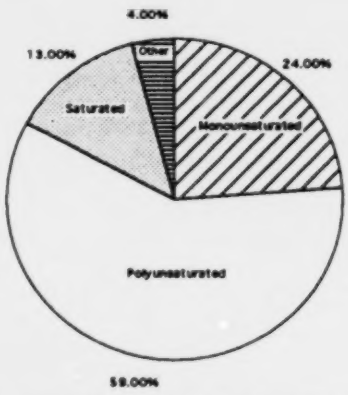
DIRECTIONS: In food preparation, it is important to apply the standards of measurement. Complete each of the following by placing the correct answer in the blank.

1. 1 T = _____ tsp.
2. 1 gal. = _____ qt.
3. 1/8 cup = _____ T
4. 1/2 T = _____ tsp.
5. 1/4 cup = _____ T
6. 1/2 cup = _____ fluid oz.
7. 75 tsp. = _____ T
8. 1 pt. = _____ fluid oz.
9. 4 fluid oz. = _____ cup(s)
10. 3 qts. = _____ cup(s)
11. 1/2 lb. = _____ oz.
12. 3/4 cup = _____ fluid oz.
13. 2 pt. = _____ cup(s)
14. 3 T = _____ tsp.
15. 12 fluid oz. = _____ cup(s)
16. 8 T = _____ cup(s)
17. 1 qt. = _____ fluid oz.
18. 1 gal. = _____ cup(s)
19. 40 oz. = _____ lb.
20. 2 qt. = _____ pt.

Circle Graphs of Various Fat Sources

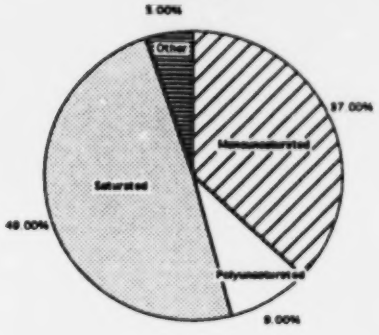
An approximate breakdown of Fatty Acid Content.				
Source	Saturated %	Polyunsaturated %	Monounsaturated %	Other %
Butter	66	4	28	2
Canola Oil	6	30	62	2
Coconut Oil	87	2	6	5
Corn Oil	see pie chart example			
Cottonseed Oil	26	50	18	6
Olive Oil	13	8	77	2
Palm Oil	see pie chart example			
Soybean Oil	66	4	28	2

Corn Oil

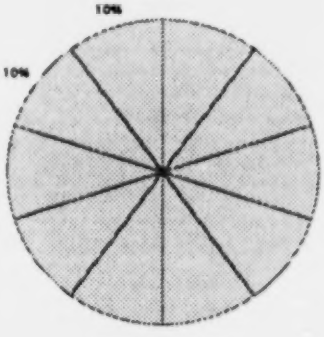


DIRECTIONS: Create a pie chart for each of the fat sources in the chart above. Make sure to label the area and percent of saturated, polyunsaturated, monounsaturated, and other on each pie chart. See examples for corn oil and palm oil.

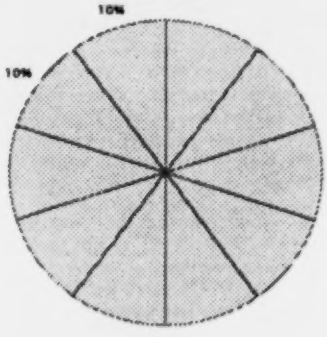
Palm Oil



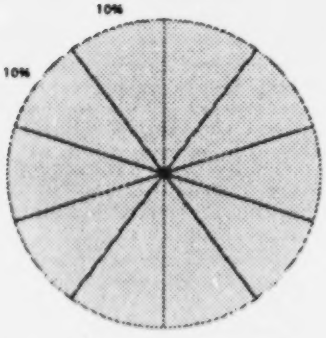
Butter



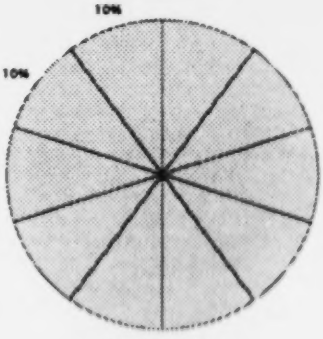
Canola Oil



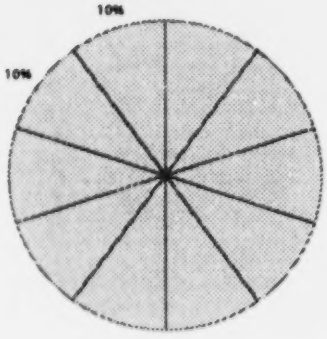
Coconut Oil



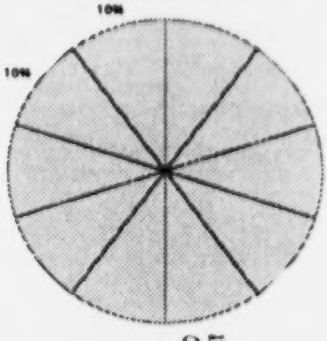
Cottonseed Oil



Olive Oil



Soybean Oil



Calculation of Energy Needs

1. Define the word *sedentary.*

2. Calculate roughly how many calories you should consume in one day if you are sedentary by multiplying your present weight by 10.

_____ x 10 = _____
Present Weight Sedentary Calorie Needs

3. Calculate your calorie needs if you are lightly active. An example of a lightly active person is a student who is involved in a walking program. Multiply your present weight by 13.

_____ x 13 = _____
Present Weight Light Activity Calories

4. Calculate your calorie needs if you are heavily active. Daily exercise programs are considered heavy activity. Multiply your present weight by 20.

_____ x 20 = _____
Present Weight Heavy Activity Calories

5. The method used decreases energy needs by 100 calories for every ten years over the age of thirty. Why might energy needs decrease over time?

6. Examine a favorite snack food from the display. Record the number of calories.

_____
# of Calories in Snack

7. Figure sedentary energy needs per minute. Do this by dividing your daily sedentary calorie needs (answer to 2) by 24 (hours).

_____ ÷ 24 = _____
Answer to 2 Energy Needs per hour

Then divide the number of calories needed for sedentary activity in one hour by 60 (minutes). This will yield energy needs per minute.

_____ ÷ 60 = _____
Energy Needs per hour Energy Needs per Minute

This is a rough estimate. Activity in which most people engage during a 24-hour period, such as walking, sitting, and sleeping, uses varying amounts of food energy.

8. Figure how many minutes it would take to use the energy in the food if you are sedentary. Divide the number of calories contained in your snack by the number of calories you would burn in one minute if you were sedentary.

_____ ÷ _____ = _____
Answer to 6 Energy Needs per Minute Minutes Needed to Use Calories

9. Calculate minutes needed for light activity.

10. Calculate minutes needed for heavy activity.